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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/575,336	04/07/2006	Hironori Kobayashi	4700.P0326US	1816
23474 7590 02/09/2011 FLYNN THIEL BOUTELL & TANIS, P.C. 2026 RAMBLING ROAD KALAMAZOO, MI 49008-1631			EXAMINER DOLLINGER, MICHAEL M	
			ART UNIT 1766	PAPER NUMBER
			MAIL DATE 02/09/2011	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/575,336

Applicant(s)

KOBAYASHI ET AL.

Examiner

MIKE DOLLINGER

Art Unit

1766

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 December 2010.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3,5-9 and 11-13 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3,5-9 and 11-13 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-945)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

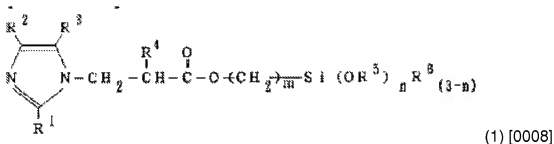
Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

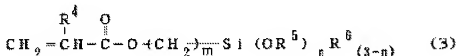
(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 1-3 and 5-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takei et al (US 5,391,664) in view of Kumagai (JP 2000-297094 A).
2. Takei et al disclose polyurethanes derived from a hydroxyl functional polymer (A) and a polyfunctional isocyanate compound (g) wherein the molar ratio NCO/OH is preferably in the range of from 0.8 to 1.2 [column 15 lines 62-68]. The polymer (A) contains vinyl-based monomers (a) including (meth)acrylic and acid alkyl (meth)acrylates [column 5 line 27] and perfluoroethylene [column 5 line 57]. The polyfunctional isocyanates include tolylene diisocyanate (TDI), diphenylmethane 4,4'-diisocyanate, hexamethylene diisocyanate (HDI), and isophorone diisocyanate [column 15 lines 30-38], as well as biurets including SUMIDUR N series [column 15 lines 38-40]. The reaction mixture may also include polyols other than polymer (A) including polyether polyol and polyester polyol [column 15 lines 3-9]. The polyurethane resins may be used for applications such as waterproof for paint film [column 19 line 26-27] or for a paint compositions [column 19 line 65 through column 20 line 5], adhesives [column 19 lines 27-28], a urethane foam [column 19 lines 31-32], and a thermosetting or thermoplastic type elastomer [column 19 lines 33-34].

3. Takei et al do not disclose the use of a silane coupling agent containing an imidazole group.
4. Kumagai disclose a resin additive for improving mechanical strength of a resin and the adhesion to metal or glass fibers [0001] of the formula (1):



obtained by reacting an imidazole of formula (2) with an acrylic silane of formula (3):



[0011].

Kumagai teaches that the resin additive should be used in an amount of 0.001 to 50 parts by weight per 100 parts by weight of resin [0021]. Kumagai also teaches that the resin additive improves adhesion properties of the resin to metals [0028]. The additive of the inventive examples is a reaction product of methacryloxypropyltrimethoxysilane and imidazole [0022]. From the disclosure of methacryloxypropyltrimethoxysilane one

having ordinary skill in the art would at once envisage 1-, 2- and 3-methacryloxypropyltrimethoxysilane.

5. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have combined an imidazole containing silane coupling agent with a polyol and polyisocyanate containing resin composition because Takei et al teach that it is within the skill of the art to make polyurethane compositions from a polyol and a polyisocyanate and Kumagai teaches that it is within the skill of the art to produce a resin additive obtained from reacting an imidazole with an acrylic silane compound. One would have been motivated to do this because Kumagai teaches that the silane coupling agent improves adhesion to various materials and also improves mechanical strength of the resin. This is combining prior art elements according to known methods to yield predictable results. Absent any evidence to the contrary, there would have been a reasonable expectation of success in achieving improved adhesion and mechanical strength in a polyurethane resin by adding a silane coupling agent reacted with an imidazole compound.

6. Claims 1-3 and 5-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takei et al (US 5,391,664) in view of Kumagai (JP 2000-297094 A) and in further view of Rasshofer (US 2003/0104241 A1).

7. Takei in view of Kumagai, discussed above, do not specifically disclose the imidazole compound coupling agent combined with the polyurethane resin before urethanization of the polyisocyanate and polyol reaction components.
8. Rasshofer teaches that 1,2-dimethylimidazole and 2-methylimidazole are known catalysts for urethane forming reactions [0048]. Rasshofer teaches that substituted imidazoles are urethanization catalysts.
9. It would have been obvious to one having ordinary skill in the art the time the invention was made to have prepared a reaction mixture of a polyol, a polyisocyanate and a silane coupling agent containing an imidazole because Takei in view of Kumagai teach that it is within the skill of the art to prepare a composition of a polyurethane and a silane coupling agent containing an imidazole and Rasshofer teaches that it is within the skill of the art to use an imidazole as a urethanization catalyst. One would have been motivated to add the silane/imidazole coupling agent of Takei in view of Kumagai to the reaction mixture of polyol and polyisocyanate rather than to a preformed polyurethane in order to catalyze the urethanization reaction. Absent any evidence to the contrary, there would have been a reasonable expectation of success in adding the imidazole coupling agent to the reaction mixture of a polyol and a polyisocyanate in the composition of Takei in view of Kumagai.

10. Claims 1-3 and 5-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takei et al (US 5,391,664) in view of Kumagai (JP 2000-297094 A), in further view of Rasshofer (US 2003/0104241 A1) and further in view of Sato et al (JP 10-280275 A).

11. Takei in view of Kumagai in view of Rasshofer, discussed above, do not explicitly disclose the simultaneous use of the imidazole-silane compound as catalyst and coupling agent.

12. Sato discloses a finishing agent for glass fabrics used in glass fabric laminates with resins in printed circuit boards [0006]. The finishing agent is the reaction product of (A) an imidazole compound with an amine reactive group and (B) a silane coupling agent [0006]. The silane compound (B) includes gamma-glycidoxypopyltrimethoxysilane [0012]. Sato teaches that the finishing agent acts simultaneously as a catalyst and a coupling agent [0030].

13. It would have been obvious to one having ordinary skill in the art the time the invention was made to have prepared a reaction mixture of a polyol, a polyisocyanate and a silane coupling agent containing an imidazole because Takei in view of Kumagai teach that it is within the skill of the art to prepare a composition of a polyurethane and a silane coupling agent containing an imidazole and Rasshofer teaches that it is within the skill of the art to use an imidazole as a urethanization catalyst. One would have been motivated to add the silane/imidazole coupling agent of Takei in view of Kumagai to the reaction mixture of polyol and polyisocyanate rather than to a preformed polyurethane because Sato teaches that imidazole-silane compounds can act simultaneously as catalyst and coupling agent. Absent any evidence to the contrary, there would have

been a reasonable expectation of success in adding the imidazole coupling agent to the reaction mixture of a polyol and a polyisocyanate in the composition of Takei in view of Kumagai.

Response to Arguments

14. Applicant's arguments filed 12/10/2010 have been fully considered but they are not persuasive.

15. Applicants argue that Takei does not read on the claims because Takei does not disclose the addition of a silane coupling agent containing an imidazole group prior to the polymerization of the vinyl based monomer in the presence of the alcohol.

Applicants argue that Takei specifically discloses that the reactor does not substantially contain any other component than the named vinyl-based monomer, alcohol, peroxide and catalyst. As such, Applicants submit that any additional component taught by another reference would destroy the invention of Takei. This argument is not convincing. The polymerization of the vinyl monomer of Takei merely prepares the polyol that is used to prepare the polyurethane. It is irrelevant whether the silane imidazole is included before or after the vinyl polymerization. Takei teaches that no other components should be added to the polymerization of the vinyl polymer A, but teaches that the vinyl polymer is then used to prepare a polyurethane. Takei does not teach that no additional components may be added to the urethanization reaction mixture.

16. Applicants argue that Kumagai makes no suggestion to adding the silane imidazole to precursor components of a resin composition, let alone a polyurethane resin. This argument is not convincing. While Kumagai does not specifically disclose a polyurethane resin, it does disclose the silane imidazole as a resin additive for thermoplastic and thermosetting resins, of which a polyurethane is one of. Furthermore, is it not true that Kumagai does not suggest adding the silane imidazole to precursor components of a resin composition, because the only specific disclosure of adding the component is to the precursor components of an epoxy resin as a hardener.

17. Applicants argue that Sato does not make obvious the claimed invention because Sato discloses the silane imidazole attached to a glass fabric which is then mixed with a matrix resin and the catalyst activity of the silane imidazole is the reaction between the glass fabric and the matrix resin, rather than the reaction to form the resin itself. On the other hand, the claimed composition is to a silane coupling agent incorporated completely into the resin compositions of the present invention. This argument is not convincing. Applicants appear to be misunderstand Sato; Sato discloses pre-pregs (i.e. mixtures of a glass fabric in a partially cured/"semi-hardened" matrix) [0029]. The catalyst activity of the imidazole is with the reaction of the matrix resin to full cure [0030]. If Applicants believe there is a direct chemical reaction between the glass fabrics and the resin matrix, what is the reaction?

18. Applicants argue that there are unexpected results in the claimed composition because they have shown that when the imidazole group containing silane coupling agents are added to a reaction system of polyol and polyisocyanate the resultant

polyurethane 1) has a lower residual isocyanate group content than that of a system to which no catalyst was added, 2) showed increased adhesion to a zinc plated steel substrate and 3) showed increased corrosion resistance effect on the zinc plated steel substrate.

19. With regards to Applicants' allegation of unexpected results found in the present invention, Applicants are reminded that any showing of unexpected results must meet three criteria: a) the experimental data must compare the claimed invention to the analogous invention of the prior art, b) the showing must be commensurate in scope with the present claims, and c) the results must be, in fact, unexpected. In the instant case the showings do not meet at least criterion c).

20. Regarding 1), the low residual isocyanate content observed after a certain period of time is an indication of an increased reaction rate. As discussed in the rejections above, the imidazole compounds are known urethanization catalysts. It is not unexpected that a catalyst will act like a catalyst and increase reaction rates.

21. Regarding 2), Kumagai teaches that the imidazole containing silane is useful for improve the adhesion of metal to resin [abstract]. It is not unexpected that the claimed compounds will improve adhesion between metal and resin.

22. Regarding 3), as Applicants have state the increased corrosion resistance is really just another measurement of improved adhesion between resin and metal [see Applicants' specification paragraph 0035]. As discussed above, it is not unexpected that the claimed compounds will improve adhesion between metal and resin.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MIKE DOLLINGER whose telephone number is (571)270-5464. The examiner can normally be reached on M-F 9-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski can be reached on 571-272-1302. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/mmd/

/RANDY GULAKOWSKI/
Supervisory Patent Examiner, Art Unit 1766